

Joint Research Centre

Certified reference materials for trace elements in plants



Aquatic plants

(Values in brackets are not certified)

[mg/kg]	BCR-596 Trapa natans, 25 g	BCR-414 Plankton, 5 g	BCR-670 Lemna minor (duck weed), 10 g	ERM-CD200 Bladderwrack (seaweed) 5g
Al		6.82 ± 0.28	(1.98 ± 0.19)	55 ± 4
As		0.383 ± 0.014	(0.0755 ± 0.0025)	0.95 ± 0.06
Cd		(1.43 ± 0.06)		
Co		23.8 ± 1.2	(2.05 ± 0.10)	1.71 ± 0.18
Cr	36.3 ± 1.7	29.5 ± 1.3	(1.82 ± 0.30)	
Cu		(1850 ± 190)		0.0186 ± 0.0016
Fe		0.276 ± 0.018		
Hg		(7.55 ± 0.17)		
K		299 ± 13		
Mn		(1.35 ± 0.20)	(0.56 ± 0.07)	
Mo		18.8 ± 0.8		0.51 ± 0.06
Ni		3.97 ± 0.19	(2.06 ± 0.12)	
Pb		(0.54 ± 0.02)	0.191 ± 0.011	0.088 ± 0.010
Sc		1.75 ± 0.10		
Se		(261 ± 25)		
Sr		8.10 ± 0.18		25.3 ± 1.7
V		111.6 ± 2.5	(24.0 ± 2.1)	
Zn			Also values for rare earth elements are assigned	

Confidence in measurements

All certificates and detailed production information can be found at <https://crm.irmm.jrc.ec.europa.eu>

<https://ec.europa.eu/jrc/>



Land plants

		BCR-100 Beech leaves, 30 g	BCR-129 Hay powder, 30 g	BCR-402 White clover, 25 g	ERM-CD281 Rye grass, 10 g	BCR-482 Lichen, 15 g
Al	[mg/kg]	435 ± 4				1103 ± 24
As	[mg/kg]			0.093 ± 0.010	0.042 ± 0.010	0.85 ± 0.07
B	[mg/kg]				5.5 ± 0.5	
Ca	[g/kg]	5.30 ± 0.05	6.40 ± 0.10			
Cd	[mg/kg]				0.120 ± 0.007	0.56 ± 0.02
Co	[mg/kg]			0.178 ± 0.008		
Cl	[g/kg]	1.49 ± 0.06				
Cr	[mg/kg]	8.0 ± 0.6			24.8 ± 1.3	4.12 ± 0.15
Cu	[mg/kg]				10.2 ± 0.5	7.03 ± 0.19
Hg	[mg/kg]				0.0164 ± 0.0022	0.48 ± 0.02
I	[mg/kg]		0.167 ± 0.024			
K	[g/kg]	9.94 ± 0.20	33.8 ± 0.8			
Mg	[g/kg]	0.878 ± 0.017	1.45 ± 0.04			
Mn	[mg/kg]				82 ± 4	
Mo	[mg/kg]			6.93 ± 0.19	2.22 ± 0.12	
N	[g/kg]	26.29 ± 0.25	37.2 ± 0.5			
Kjeldahl-N	[g/kg]		34.2 ± 0.4			
Ni	[mg/kg]				15.2 ± 0.6	2.47 ± 0.07
P	[g/kg]	1.55 ± 0.04	2.36 ± 0.07			
Pb	[mg/kg]				1.67 ± 0.11	40.9 ± 1.4
S	[g/kg]	2.69 ± 0.04	3.16 ± 0.04			
Sb	[mg/kg]				0.042 ± 0.007	
Se	[mg/kg]			6.70 ± 0.25	0.023 ± 0.004	
Sn	[mg/kg]				0.062 ± 0.011	
Zn	[mg/kg]		32.1 ± 1.7		30.5 ± 1.1	100.6 ± 2.2

Food plants

Code	Certified values
BCR-679 White cabbage 15 g	B [mg/kg] (27.7 ± 1.9)
	Ba [mg/kg] (10.3 ± 0.6)
	Ca [mg/kg] (7768 ± 655)
	Cd [mg/kg] 1.66 ± 0.07
	Cr [mg/kg] (0.6 ± 0.1)
	Cu [mg/kg] 2.89 ± 0.12
	Fe [mg/kg] 55.0 ± 2.5
	Hg [μg/kg] 6.3 ± 1.4
	Mg [mg/kg] (1362 ± 127)
	Mn [mg/kg] 13.3 ± 0.5
	Mo [mg/kg] 14.8 ± 0.5
	Ni [mg/kg] 27.0 ± 0.8
	P [mg/kg] (3307 ± 241)
	Sb [μg/kg] 20.6 ± 2.6
	Sr [mg/kg] 11.8 ± 0.4
	Tl [μg/kg] 3.0 ± 0.3
	Zn [mg/kg] 79.7 ± 2.7
IRMM-804 Rice flour 15 g	As [mg/kg] 0.049 ± 0.004
	Cd [mg/kg] 1.61 ± 0.07
	Cu [mg/kg] 2.74 ± 0.24
	Mn [mg/kg] 34.2 ± 2.3
	Pb [mg/kg] 0.42 ± 0.07
BCR-383 Haricots verts 100 g	Ca [g/kg] 2.85 ± 0.23
	K [g/kg] 7.8 ± 0.4
	Mg [g/kg] (0.9)
	Na [g/kg] 0.075 ± 0.007
	P [g/kg] (1.8)

(Values in brackets are not certified)

How to order reference materials

From JRC in Geel

Tel.: +32 14 571 705 • Fax: +32 14 590 406
<https://ec.europa.eu/jrc/en/reference-materials>
 E-mail: jrc-irmm-rm-distribution@ec.europa.eu

From authorised distributors

LGC Standards GmbH (DE)
<http://www.lgcstandards.com/>
 E-mail: de@lgcstandards.com

Sigma-Aldrich Chemie GmbH (CH)
<http://www.sigmaaldrich.com/irmm>
 E-mail: flukatec@sial.com

Sigma-Aldrich RTC Inc. (USA)
<http://www.RT-Corp.com>
 E-mail: RTCSalesgroup@sial.com

ARMI (USA)
<http://www.armi.com>
 E-mail: Info@ARMI.com

Industrial Analytical (RSA)
<http://www.industrialanalytical.co.za>
 E-mail: info@industrialanalytical.co.za



Accredited CRM Producer: the JRC-IRMM is accredited to ISO Guide 34:2009 for the production of reference materials under the code BELAC 268-RM